This document gives pertinent information concerning reissuance of the VPDES Permit listed below. This permit is being processed as a Minor, Municipal permit. The discharge results from the operation of a 0.22 MGD wastewater treatment plant. This permit action consists of updating the WQS and boilerplate. The effluent limitations and special conditions contained in this permit will maintain the Water Quality Standards of 9 VAC 25-260-00 et seq.

1.	Facility Name and Mailing Address:	Lake Land 'Or Wastewater Treatment Plant 2414 Granite Ridge Road Rockville, VA 24146	SIC Code:	4952
	Facility Location:	200 Kent Drive Ruther Glen, VA 22546	County:	Caroline
	Facility Contact Name:	Luther Ghorley, Jr.	Telephone Number:	(804) 749-8869
2.	Permit No.:	VA0060887	Expiration Date:	December 20, 2009
	Other VPDES Permits:	VAN030110		
	Other Permits:	Not Applicable		
	E2/E3/E4 Status:	Not Applicable		
3.	Owner Name:	Aqua Virginia, Inc.		
	Owner Contact / Title:	Gregory K. Odell Chief Operating Officer	Telephone Number:	(804) 749-8868
4.	Application Complete Date:	July 29, 2009		
	Permit Drafted By:	Susan Oakes / Douglas Frasier	Date Drafted:	February 1, 2010
	Draft Permit Reviewed By:	Alison Thompson	Date Reviewed:	March 3, 2010
	Public Comment Period:	Start Date: August 13, 2010	End Date:	September 13, 2010

5. Receiving Waters Information: See **Attachment 1** for the Flow Frequency Determination

Receiving Stream Name:	South River, UT		
Drainage Area at Outfall:	13.1 square miles	River Mile :	0.12
Stream Basin:	York	Subbasin:	York
Section:	3	Stream Class:	III
Special Standards:	None	Waterbody ID:	VANF19R
7Q10 Low Flow:	0.00 MGD	7Q10 High Flow:	0.00 MGD
1Q10 Low Flow:	0.00 MGD	1Q10 High Flow:	0.00 MGD
Harmonic Mean Flow:	0.00 MGD	30Q5 Flow:	0.00 MGD
303(d) Listed:	No	30Q10 Flow:	0.00 MGD
TMDL Approved:	Not Applicable	Date TMDL Approved:	Not Applicable

6. Statutory or Regulatory Basis for Special Conditions and Effluent Limitations:

- ✓ State Water Control Law
- ✓ Clean Water Act
- ✓ VPDES Permit Regulation
- ✓ EPA NPDES Regulation
- ✓ EPA Guidelines
- ✓ Water Quality Standards
- Other

7. Licensed Operator Requirements: Class II

8. Reliability Class: Class I

9. Permit Characterization:

✓	Private	✓	Effluent Limited		Possible Interstate Effect
	Federal	✓	Water Quality Limited		Compliance Schedule Required
	State		Toxics Monitoring Program Required		Interim Limits in Permit
	POTW		Pretreatment Program Required		Interim Limits in Other Document
	TMDL				

10. Wastewater Sources and Treatment Description:

The Lake Land 'Or WWTP serves the Lake Land 'Or residential community with a population of 2030 with 964 residences. The facility consists of a static fine screen, two trains each consisting of an anoxic zone, oxic zone, secondary clarifier, disk filter, and UV disinfection with final effluent discharged to an unnamed tributary (UT) of the South River. The static fine screen removes non-organic material from the influent wastewater where it is collected in a dumpster for disposal in a landfill. The anoxic and oxic zones are for denitrification and nitrification. An internal recycle line returns mixed liquor to the anoxic zone to aid in the denitrification process. The system has the capability of adding polyaluminum chloride to the end of the oxic basin for phosphorous removal if needed. Solids that settle in the clarifier are either recycled as return activated sludge or wasted to the sludge holding tank. Digested sludge is removed from the sludge holding tank by a licensed sludge hauler and transferred to the Little Falls Run WWTF for further processing and disposal. Effluent from the clarifier is transferred to the disk filter where it passes through the submerged cloth media and directed to the UV disinfection. Backwash water is transferred to equalization basin number one. Should there be a UV system failure; the facility has a backup chlorination/dechlorination system.

The facility was issued a CTO for this plant upgrade and expansion to the 0.22 MGD plant on June 16, 2009.
See **Attachment 2** for a facility schematic/diagram.

TABLE 1
OUTFALL DESCRIPTION

Outfall Number	Discharge Sources	Treatment	Design Flow	Outfall Latitude / Longitude
001	Domestic Wastewater	See Item 10 above.	0.22 MGD	38° 01' 50" N / 77° 32' 59" W
See **Attachment 3** for Ladysmith, DEQ #170D topographic map.				

11. Sludge Treatment and Disposal Methods:

Digested sludge is removed from the sludge holding tank by a licensed sludge hauler and transferred to the Little Falls Run WWTF (VA0076392) for further processing and disposal.

12. Monitoring Stations in Vicinity of Discharge:

TABLE 2	
8-STH007.67	DEQ water quality monitoring station located on the South River at the Rt. 743 bridge crossing, approximately 5.3 miles downstream from the outfall.

13. Material Storage:

TABLE 3 MATERIAL STORAGE		
Materials Description	Volume Stored	Spill/Stormwater Prevention Measures
Dry Lime	2/50 Lb. Bags	Stored in Building
Lime Slurry	4,600 Gallons	Stored Behind Building (there is a floor drain – flows to the digester)
Sodium Hypochlorite Solution	55 Gallons	Stored in Building beside UV Channel
Dry Polymer	2/50 Lb. Bags	Stored in Building
Liquid Polymer	200 Gallons Delpac	Stored in Building
Sodium Bisulfate	25 Gallons	Stored in Building Beside UV Channel

14. Site Inspection: Performed by Susan Oakes and Bryant Thomas on March 16, 2010 (see **Attachment 4**).

15. Receiving Stream Water Quality and Water Quality Standards:

a) Ambient Water Quality Data

Outfall 001 discharges into an unnamed tributary to the South River. There is no monitoring data for this unnamed tributary. The nearest downstream DEQ water quality monitoring station with ambient data is Station 8-STH007.67, located on South River at the Rt. 743 bridge crossing, approximately 5.3 miles downstream from the outfall. This monitoring station is located in segment VAN-F19R_STH03A08.

The monitoring summary for Station 8-STH007.67, as taken from the 2008 Integrated Assessment are considered fully supporting for the aquatic life, recreation, and wildlife uses. The fish consumption use was not assessed.

The receiving stream, South River, UT, is not on the current 303(d) list; however, the UT flows into the South River, which has 2 downstream impairments. The South River in turn flows into the Mattaponi River, which has several impairments as well.

South River segment (VAN-F19R_STH01A00) is listed as not supporting the (1) recreation use and (2) aquatic life use.

1. Recreation Use: Sufficient excursions from the instantaneous *E. coli* bacteria criterion (2 of 16 samples - 12.5%) were recorded at DEQ's ambient water quality monitoring station (8-STH004.37) at the Route 638 crossing to assess this stream segment as not supporting of the recreation use goal for the 2008 water quality assessment. The segment was previously listed for fecal coliform bacteria impairment, from 2004 through 2006. The *E. coli* bacteria impairment was first listed in 2008.

2. Aquatic Life Use: Sufficient excursions below the lower limit of the pH criterion range (2 of 18 samples - 11.1%) were recorded at DEQ's ambient water quality monitoring station (8-STH004.37) at the Route 638 crossing to assess this stream segment as not supporting of the aquatic life use goal for the 2008 water quality assessment. (Information taken from the planning statement which can be found in the permit file.)

Significant portions of the Chesapeake Bay and its tributaries are listed as impaired on Virginia's 303(d) list of impaired waters for not meeting the aquatic life use support goal, and the 2006 Virginia Water Quality Assessment 305(b)/303(d) Integrated Report indicates that much of the mainstem Bay does not fully support this use support goal under Virginia's Water Quality Assessment guidelines. Nutrient enrichment is cited as one of the primary causes of impairment.

In response, the Virginia General Assembly amended the State Water Control Law in 2005 to include provisions addressing nutrient loadings to the Chesapeake Bay. This statute set forth total nitrogen and total phosphorus discharge restrictions within the bay watershed. Concurrently, the State Water Control Board adopted new water quality criteria for the Chesapeake Bay and its tidal tributaries. These actions necessitate the evaluation and the inclusion of nitrogen and phosphorus limits on discharges within the bay watershed.

b) Receiving Stream Water Quality Criteria

Part IX of 9VAC25-260(360-550) designates classes and special standards applicable to defined Virginia river basins and sections. The receiving stream South River, UT is located within Section 3 of the York River Basin, and classified as Class III water.

At all times, Class III waters must achieve a dissolved oxygen (D.O.) of 4.0 mg/L or greater, a daily average D.O. of 5.0 mg/L or greater, a temperature that does not exceed 32°C, and maintain a pH of 6.0-9.0 standard units (S.U.). The D.O. minimum for this facility will be 5.0 mg/L in keeping with the current guidance for the development of effluent limits for swamp and marsh waters as is the designation for this discharge.

Attachment 5 details other water quality criteria applicable to the receiving stream.

Ammonia:

The 7Q10 and 1Q10 of the receiving stream are 0.0 MGD. In cases such as this, effluent pH and temperature data may be used to establish the ammonia water quality standard. Land 'Or was issued a CTO for a plant upgrade and expansion to 0.22 MGD on June 16, 2009. Since the plant upgrade is less than a year old, staff used a default temperature value of 25°C and a pH value of 8.0 S.U. to calculate the ammonia water quality standards. The ammonia water quality standards calculations are shown in **Attachment 5**.

Metals Criteria:

The 7Q10 of the receiving stream is zero and no ambient data is available, the effluent data for hardness can be used to determine the metals criteria. Since the facility has undergone a plant upgrade and expansion, after the issuance of the CTO, Land 'Or collected twelve effluent samples for copper and zinc using clean analysis protocols. Additionally, samples were collected for hardness evaluation. Land 'Or staff believe the metals and hardness data collected and analyzed using clean sampling and analysis protocols provides effluent data more representative of the upgraded facility. The hardness-dependent metals criteria in **Attachment 5** are based on an effluent value of 129 mg/L obtained from the hardness evaluation.

Bacteria Criteria:

The Virginia Water Quality Standards (9VAC25-260-170.A.) states that the following criteria shall apply to protect primary recreational uses in surface waters:

E. coli bacteria per 100 mL of water shall not exceed the following:

	Monthly Geometric Mean[1]
Freshwater *E. coli* (N/100 mL)	126

[1]Four or more samples taken during any calendar month

c) Receiving Stream Special Standards

The State Water Control Board's Water Quality Standards, River Basin Section Tables (9VAC25-260-360, 370 and 380) designates the river basins, sections, classes and special standards for surface waters of the Commonwealth of Virginia. The receiving stream, South River, UT, is located within Section 3 of the York River Basin. This section has no special standard designations.

d) Threatened or Endangered Species

The Virginia DGIF Fish and Wildlife Information System Database was searched on October 22, 2009 for records to determine if there are threatened or endangered species in the vicinity of the discharge. No threatened or endangered species were identified.

16. Antidegradation (9 VAC 25-260-30):

All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

The receiving stream conditions were previously based on guidance for Swamp and Marsh Waters. Conditions have not changed and are therefore considered to be valid. Staff will carry forward the receiving stream classification as Tier 1. Permit limits proposed have been established by determining wasteload allocations which will result in attaining and/or maintaining all water quality criteria which apply to the receiving stream, including narrative criteria. These wasteload allocations will provide for the protection and maintenance of all existing uses.

17. Effluent Screening, Wasteload Allocation, and Effluent Limitation Development:

To determine water quality-based effluent limitations for a discharge, the suitability of data must first be determined. Data is suitable for analysis if one or more representative data points is equal to or above the quantification level ("QL") and the data represent the exact pollutant being evaluated.

Next, the appropriate Water Quality Standards (WQS) are determined for the pollutants in the effluent. Then, the Wasteload Allocations (WLA) are calculated. In this case since the critical flows 7Q10 and 1Q10 have been determined to be zero, the WLA's are equal to the WQS. The WLA values are then compared with available effluent data to determine the need for effluent limitations. Effluent limitations are needed if the 97th percentile of the daily effluent concentration values is greater than the acute wasteload allocation or if the 97th percentile of the four-day average effluent concentration values is greater than the chronic wasteload allocation. Effluent limitations are based on the most limiting WLA, the required sampling frequency, and statistical characteristics of the effluent data.

a) Effluent Screening

Effluent data showed exceedances of permit effluent limitations for Ammonia as N, Total Kjeldahl Nitrogen (TKN), Biochemical Oxygen Demand (BOD) and Total Suspended Solids, (TSS). The facility was under a Consent Order to resolve these exceedances through the upgrade and expansion to the 0.22 MGD plant. Data obtained after the issuance of the CTO in June 2009 indicated no exceedances for ammonia, TKN, BOD and TSS.

b) Mixing Zones and Wasteload Allocations (WLAs)

Wasteload allocations (WLAs) are calculated for those parameters in the effluent with the reasonable potential to cause an exceedance of water quality criteria. The basic calculation for establishing a WLA is the steady state complete mix equation:

$$WLA = \frac{C_o [Q_e + (f) (Q_s)] - [(C_s) (f) (Q_s)]}{Q_e}$$

Where:
- WLA = Wasteload allocation
- C_o = In-stream water quality criteria
- Q_e = Design flow
- Q_s = Critical receiving stream flow (1Q10 for acute aquatic life criteria; 7Q10 for chronic aquatic life criteria; harmonic mean for carcinogen-human health criteria; 30Q10 for ammonia criteria; and 30Q5 for non-carcinogen human health criteria)
- f = Decimal fraction of critical flow
- C_s = Mean background concentration of parameter in the receiving stream.

The water segment receiving the discharge via Outfall 001 is considered to have a 7Q10 and 1Q10 of 0.0 MGD. As such, there is no mixing zone and the WLA is equal to the C_o.

c) Effluent Limitations, Outfall 001 – Toxic Pollutants

9VAC25-31-220.D. requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an in-stream excursion of water quality criteria. Those parameters with WLAs that are near effluent concentrations are evaluated for limits.

The VPDES Permit Regulation 9VAC25-31-230.D. requires that monthly and weekly average limitations be imposed for continuous discharges from POTWs and monthly average and daily maximum limitations be imposed for all other continuous non-POTW discharges.

1) Ammonia as N/TKN:

Staff used the revised MSTRANTI spreadsheet dated October 2009 to calculate the ammonia water quality criteria and waste load allocation analysis. As the facility has been operating under the 0.22 MGD capacity for less than one year, staff used the temperature value of 25°C and a pH value of 8.0 S.U. DEQ guidance suggests using a sole data point of 9.0 mg/L for discharges containing domestic sewage to ensure the evaluation adequately addresses the potential for ammonia to be present in the discharge containing domestic sewage.

The previous permit under the old plant, had ammonia as nitrogen limits of 4.6 mg/L monthly average and 6.2 mg/L weekly average for the period of November through February. These limits were established to address the ammonia toxicity concerns during the winter months when temperatures are less than 10°C. Ammonia limits derived from the newly calculated water quality criteria and waste load allocation analysis under the upgraded plant for this permit cycle will be 1.3 mg/L monthly average and 1.8 mg/L weekly average limit for the period of November through February.

Previously, there were no ammonia limits established for the summer months March through October because the facility had a TKN limit of 3.0 mg/L. It is assumed that when a TKN limit of 3.0 mg/L is met, there is no ammonia present in the discharge. The TKN limit of 3.0 mg/L from March through October is carried forward with this permit cycle.

2) Total Residual Chlorine:

Chlorine is used for backup disinfection and is potentially in the discharge. Staff calculated WLAs for TRC using current critical flows and the mixing allowance. In accordance with current DEQ guidance, staff used a default data point of 0.2 mg/L and the calculated WLAs to derive limits. A monthly average of 0.008 mg/L and a weekly average limit of 0.010 mg/L are proposed for this discharge should the need for the backup chlorine system become necessary (see **Attachment 6**).

3) Metals/Organics:

The previous permit cycle included copper and zinc limits. Land 'Or staff stated that routine sampling and analysis techniques were used and believe that the data used to establish the metals limits in the previously issued permits may have been subject to contamination that affected the accuracy of the data. For this permit reissuance, Land 'Or staff used metal and hardness data collected and analyzed using clean sampling and analysis protocols which they believe provides effluent data more representative of the upgraded facility to re-evaluate the zinc and copper limits. Land 'Or provided DEQ staff with the monitoring and sampling study. Based on the data provided, DEQ re-evaluated the need for metals limits and determined that no limits are needed with this permit reissuance for the copper and zinc parameters. See **Attachments 5 and 6** respectively for WLA and derivation of the limits. Additionally, the metals evaluation study can be found in the permit file.

d) Effluent Limitations and Monitoring, Outfall 001 – Conventional and Non-Conventional Pollutants

No changes to carbonaceous-Biochemical Oxygen Demand ($cBOD_5$), Total Suspended Solids (TSS), Total Kjeldahl Nitrogen (TKN) and pH limitations are proposed.

Effluent limits for $cBOD_5$, TSS and TKN were established in the previous permit and were based on guidance for the development of Effluent Limits for Swamp and Marsh Waters. The receiving stream conditions and effluent limits remain valid and will be carried forward as part of this reissuance.

The Dissolved Oxygen (D.O.) minimum limitation was increased from 3.0 mg/L to 5.0 mg/L with this reissuance. This reflects the current VPDES Permit Manual regarding Swamp & Marsh Waters.

pH limitations are set at the water quality criteria.

E. coli limitations are in accordance with the Water Quality Standards 9VAC25-260-170.

e) Effluent Annual Average Limitations and Monitoring, Outfall 001 – Nutrients

VPDES Regulation 9VAC25-31-220(D) requires effluent limitations that are protective of both the numerical and narrative water quality standards for state waters, including the Chesapeake Bay.

As discussed in Section 15, significant portions of the Chesapeake Bay and its tributaries are listed as impaired with nutrient enrichment cited as one of the primary causes. Virginia has committed to protecting and restoring the Bay and its tributaries. There are three regulations that necessitate nutrient limitations:

- 9VAC25-40 – *Regulation for Nutrient Enriched Waters and Dischargers within the Chesapeake Bay Watershed* requires new or expanding discharges with design flows of $\geq$ 0.04 MGD to treat for TN and TP to either BNR levels (TN = 8.0 mg/L; TP = 1.0 mg/L) or SOA levels (TN = 3.0 mg/L and TP = 0.30 mg/L).

- 9VAC25-720 – *Water Quality Management Plan Regulation* sets forth TN and TP maximum wasteload allocations for facilities designated as significant discharges, i.e., those with design flows of $\geq$ 0.5 MGD above the fall line and $\geq$ 0.1 MGD below the fall line. This regulation limits the total nitrogen and total phosphorus mass loadings from these discharges.

- 9VAC25-820 – *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia* became effective January 1, 2007. This regulation specifies and controls the nitrogen and phosphorus loadings from facilities and specifies facilities that must register under the general permit. Nutrient loadings for those facilities registered under the general permit as well as compliance schedules and other permit requirements, shall be authorized, monitored, limited, and otherwise regulated under the general permit and not this individual permit. This facility has coverage under this General Permit; the permit number is VAN030110.

Monitoring for Nitrates + Nitrites, Total Kjeldahl Nitrogen, Total Nitrogen, and Total Phosphorus are included in this permit. The monitoring is needed to protect the Water Quality Standards of the Chesapeake Bay. Monitoring frequencies were established as set forth in 9VAC25-820.

Annual average effluent limitations, as well as monthly and year to date calculations, for Total Nitrogen and Total Phosphorus are included in this individual permit.

At 0.22 MGD flow, concentration limits of 8.0 mg/L TN annual average and 1.0 mg/L TP annual average are needed based on 9VAC25-40-70.A(2). Loading limits will be governed by the general permit mentioned above.

f) Effluent Limitations and Monitoring Summary

The effluent limitations are presented in the following table. Limits were established for BOD_5, $cBOD_5$, Total Suspended Solids, Ammonia, pH, Dissolved Oxygen, Total Residual Chlorine, Total Kjeldahl Nitrogen, Total Nitrogen, Total Phosphorus and *E. coli*.

The limit for Total Suspended Solids is based on Best Professional Judgment and guidance for the development of effluent limits for swamp and marsh waters.

The mass loading (kg/d) for monthly and weekly averages were calculated by multiplying the concentration values (mg/L) with the flow values (in MGD); then applying a conversion factor of 3.785.

The mass loading (lb/d) for TKN monthly and weekly averages were calculated by multiplying the concentration values (mg/L) with the flow values (in MGD); then applying a conversion factor of 8.3438.

Sample Type and Frequency are in accordance with the recommendations in the VPDES Permit Manual.

The VPDES Permit Regulation at 9VAC25-31-30 and 40 CFR Part 133 require that the facility achieve at least 85% removal for cBOD and TSS (or 65% for equivalent to secondary). The limits in this permit are water-quality-based effluent limits and result in greater than 85% removal.

18. Antibacksliding:

The backsliding proposed with this reissuance conforms to the anti-backsliding provisions of Section 402(o) of the Clean Water Act, 9VAC25-31-220.L., and 40 § CFR 122.44.

Substantial alterations and upgrades have occurred at this facility since the last reissuance. New information was obtained, allowing the re-evaluation of previous copper and zinc limitations and the final determination that limits were no longer warranted.

19. Effluent Limitations/Monitoring Requirements:

Design flow is 0.22 MGD.
Effective Dates: During the period beginning with the permit's effective date and lasting until the expiration date.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NL	Continuous	TIRE
pH	3	NA	NA	6.0 S.U.	9.0 S.U.	1/D	Grab
$cBOD_5$ (March – October)	5	10 mg/L 8.3 kg/d	15 mg/L 12 kg/d	NA	NA	3D/W	8H-C
BOD_5 (November – February)	2,3	10 mg/L 8.3 kg/d	15 mg/L 12 kg/d	NA	NA	3D/W	8H-C
Total Suspended Solids (TSS)	5	10 mg/L 8.3 kg/d	15 mg/L 12 kg/d	NA	NA	3D/W	8H-C
Dissolved Oxygen (DO)	3,5	NA	NA	5.0 mg/L	NA	1/D	Grab
Total Kjeldahl Nitrogen (TKN) (March – October)	5	3.0 mg/L 5.5 lb/d	4.5 mg/L 8.3 lb/d	NA	NA	3D/W	8H-C
Ammonia, as N (November - February)	3	1.3 mg/L	1.8 mg/L	NA	NA	3D/W	8H-C
E. coli (Geometric Mean)	3	126 n/100mL	NA	NA	NA	3D/W	Grab*
Total Residual Chlorine (after contact tank)	4	NA	NA	1.0 mg/L	NA	3/D at 4-hr Intervals	Grab**
Total Residual Chlorine (after dechlorination)	3	0.008 mg/L	0.010 mg/L	NA	NA	3/D at 4-hr Intervals	Grab**
Nitrate+Nitrite, as N	3,6	NL mg/L	NA	NA	NA	1/2W	8H-C
Total Nitrogen [a.]	3,6	NL mg/L	NA	NA	NA	1/2W	Calculated
Total Nitrogen – Year to Date [b.]	3,6	NL mg/L	NA	NA	NA	1/2W	Calculated
Total Nitrogen – Calendar Year [b.]	3,6	8.0 mg/L	NA	NA	NA	1/Y	Calculated
Total Phosphorus	3,6	NL mg/L	NA	NA	NA	1/2W	8H-C
Total Phosphorus – Year to Date [b.]	3,6	NL mg/L	NA	NA	NA	1/2W	Calculated
Total Phosphorus – Calendar Year [b.]	3,6	1.0 mg/L	NA	NA	NA	1/Y	Calculated

The basis for the limitations codes are:

1. Federal Effluent Requirements
2. Best Professional Judgement
3. Water Quality Standards
4. DEQ Disinfection Guidance
5. Guidance for the development of effluent limits for Swamp & Marsh Waters.
6. 9 VAC 25-40 (Nutrient Regulation)

MGD = Million gallons per day.
NA = Not applicable.
NL = No limit; monitor and report.
S.U. = Standard units.
TIRE = Totalizing, indicating and recording equipment.

1/D = Once every day.
1/2W = Once every two weeks.
3D/W = Three days every week.
3/D = Three times every day.
1/Y = Once every year.

8H-C = A flow proportional composite sample collected manually or automatically, and discretely or continuously, for the entire discharge of the monitored 8-hour period. Where discrete sampling is employed, the permittee shall collect a minimum of eight (8) aliquots for compositing. Discrete sampling may be flow proportioned either by varying the time interval between each aliquot or the volume of each aliquot. Time composite samples consisting of a minimum eight (8) grab samples obtained at hourly or smaller intervals may be collected where the permittee demonstrates that the discharge flow rate (gallons per minute) does not vary by 10% or more during the monitored discharge.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.

* Samples shall be collected between 10 A.M. and 4 P.M.

** TRC is only required when chlorine is used for disinfection.

a. Total Nitrogen = Sum of TKN plus Nitrate+Nitrite

b. See Section 20.a. for the calculation of the Nutrient Calculations.

20. Other Permit Requirements:

Part I.B. of the permit contains additional chlorine monitoring requirements, quantification levels and compliance reporting instructions

The facility has UV disinfection; however, chlorine disinfection is available as an alternate means of disinfection should it become necessary. Chlorine limits are defined in this section as well as monitoring requirements to take effect should an alternate means of disinfection be used and are as follows: A minimum chlorine residual must be maintained at the exit of the chlorine contact tank to assure adequate disinfection. No more than 10% of the monthly test results for TRC at the exit of the chlorine contact tank shall be < 1.0 mg/L with any TRC < 0.6 mg/L considered a system failure.

9VAC25-31-190.L.4.c. requires an arithmetic mean for measurement averaging and 9VAC25-31-220.D. requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an in-stream excursion of water quality criteria. Specific analytical methodologies for toxics are listed in this permit section as well as quantification levels (QLs) necessary to demonstrate compliance with applicable permit limitations or for use in future evaluations to determine if the pollutant has reasonable potential to cause or contribute to a violation. Required averaging methodologies are also specified.

The calculations for the Nitrogen and Phosphorus parameters shall be in accordance with the calculations set forth in 9VAC25-820 *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia*. §62.1-44.19:13 of the Code of Virginia defines how annual nutrient loads are to be calculated; this is carried forward in 9VAC25-820-70. As annual concentrations (as opposed to loads) are limited in the individual permit, these reporting calculations are intended to reconcile the reporting calculations between the permit programs, as the permittee is collecting a single set of samples for the purpose of ascertaining compliance with two permits.

21. Other Special Conditions:

a) 95% Capacity Reopener. The VPDES Permit Regulation at 9VAC25-31-200.B.2. requires all POTWs and PVOTWs develop and submit a plan of action to DEQ when the monthly average influent flow to their sewage treatment plant reaches 95% or more of the design capacity authorized in the permit for each month of any three consecutive month period. The facility is a PVOTW.

b) Indirect Dischargers. Required by VPDES Permit Regulation, 9VAC25-31-280 B.9 for POTWs and PVOTWs that receive waste from someone other than the owner of the treatment works.

c) O&M Manual Requirement. Required by Code of Virginia §62.1-44.19; Sewage Collection and Treatment Regulations, 9VAC25-790; VPDES Permit Regulation, 9VAC25-31-190.E. The permittee submitted a revised Operations and Maintenance (O&M) Manual on July 12, 2010 to the Department of Environmental Quality, Northern Regional Office (DEQ-NRO). Future changes to the facility must be addressed by the submittal of a revised O&M Manual within 90 days of the changes. Non-compliance with the O&M Manual shall be deemed a violation of the permit.

d) CTC, CTO Requirement. The Code of Virginia § 62.1-44.19; Sewage Collection and Treatment Regulations, 9VAC25-790 requires that all treatment works treating wastewater obtain a Certificate to Construct prior to commencing construction and to obtain a Certificate to Operate prior to commencing operation of the treatment works.

e) Licensed Operator Requirement. The Code of Virginia at §54.1-2300 et seq. and the VPDES Permit Regulation at 9VAC25-31-200.C., and Rules and Regulations for Waterworks and Wastewater Works Operators (18VAC160-20-10 et seq.) requires licensure of operators. This facility requires a Class II operator.

f) Reliability Class. The Sewage Collection and Treatment Regulations at 9VAC25-790 require sewage treatment works to achieve a certain level of reliability in order to protect water quality and public health consequences in the event of component or system failure. Reliability means a measure of the ability of the treatment works to perform its designated function without failure or interruption of service. The facility is required to meet a reliability Class of I.

g) Water Quality Criteria Reopener. The VPDES Permit Regulation at 9VAC25-31-220.D. requires establishment of effluent limitations to ensure attainment/maintenance of receiving stream water quality criteria. Should effluent monitoring indicate the need for any water quality-based limitations, this permit may be modified or alternatively revoked and reissued to incorporate appropriate limitations.

h) Sludge Reopener. The VPDES Permit Regulation at 9VAC25-31-200.C.4. requires all permits issued to treatment works treating domestic sewage (including sludge-only facilities) include a reopener clause allowing incorporation of any applicable standard for sewage sludge use or disposal promulgated under Section 405(d) of the CWA. The facility includes a sewage treatment works.

i) Sludge Use and Disposal. The VPDES Permit Regulation at 9VAC25-31-100.P., 220.B.2., and 420-720, and 40 CFR Part 503 require all treatment works treating domestic sewage to submit information on their sludge use and disposal practices and to meet specified standards for sludge use and disposal. The facility includes a treatment works treating domestic sewage.

j) Nutrient Offsets. The Virginia General Assembly, in their 2005 session, enacted a new Article 4.02 (Chesapeake Bay Watershed Nutrient Credit Exchange Program) to the Code of Virginia to address nutrient loads to the Bay. Section 62.1-44.19:15 sets forth the requirements for new and expanded dischargers, which are captured by the requirements of the law, including the requirement that non-point load reductions acquired for the purpose of offsetting nutrient discharges be enforced through the individual VPDES permit.

k) E3/E4. 9VAC25-40-70.B. authorizes DEQ to approve an alternate compliance method to the technology-based effluent concentration limitations as required by subsection A of this section. Such alternate compliance method shall be incorporated into the permit of an Exemplary Environmental Enterprise (E3) facility or an Extraordinary Environmental Enterprise (E4) facility to allow the suspension of applicable technology-based effluent concentration limitations during the period the E3 or E4 facility has a fully implemented environmental management system that includes operation of installed nutrient removal technologies at the treatment efficiency levels for which they were designed.

l) Nutrient Reopener. 9VAC25-40-70.A. authorizes DEQ to include technology-based annual concentration limits in the permits of facilities that have installed nutrient control equipment, whether by new construction, expansion or upgrade. 9VAC25-31-390.A. authorizes DEQ to modify VPDES permits to promulgate amended water quality standards.

m) Comparison Sampling. The permittee installed an auto sampler within the plant and requested that a new sampling location be considered at this location. DEQ requested quarterly comparison sampling at the existing and proposed locations for one year in order to ensure sampling would be representative and that compliance would be maintained at the new sampling location. Sampling of all parameters except Dissolved Oxygen (DO) and Bacteria were to be taken at the proposed location and all parameters were to be taken at the existing location. Data results indicate that not all parameters were sampled every time. Staff also noted that sampling protocol was not consistent at the two locations. The permittee shall; therefore, repeat the comparison sampling ensuring that 1) samples are comparable, 2) all parameters are sampled at both locations, and 3) sampling protocol is to be consistent for both locations. The permittee initiated the comparison sampling protocol, satisfying the earlier discrepancies noted during the initial study. DEQ staff shall review the data and notify the permittee whether the sampling location can be moved.

n) Inflow and Infiltration. The permittee estimates 7,000 gpd flows into the plant from inflow and/or infiltration (I&I). As part of the consent order, the permittee shall complete flow monitoring by December 31, 2010 and complete items addressed in correspondence received on March 1, 2010. Upon completion of the items required under the Order, and as part of this permit issuance, the permittee shall continue to administer and fund a program to address the I&I problems identified in the Plan. An annual report shall be submitted to DEQ-NRO by February 10th of every year beginning in 2011 detailing the previous year's activities. The report shall include at a minimum:

- The total funds allocated for the I&I program during the previous year;
- A summary of all studies/surveys conducted during the previous year;
- A summary of completed rehabilitation projects; and
- Projected/proposed course of actions for the upcoming year.

The permittee may request to DEQ-NRO that this requirement be removed at the next reissuance cycle.

o) Pump Station Reliability. The permittee shall submit a plan and schedule outlining projected upgrades to all pump stations in order to satisfy the Reliability Class I requirement of this permit. This plan shall be submitted to DEQ-NRO for review and comment on or before January 10, 2011.

p) TMDL Reopener. This special condition is to allow the permit to be reopened if necessary to bring it in compliance with any applicable TMDL that may be developed and approved for the receiving stream.

Permit Section Part II. Part II of the permit contains standard conditions that appear in all VPDES Permits. In general, these standard conditions address the responsibilities of the permittee, reporting requirements, testing procedures and records retention.

22. Changes to the Permit from the Previously Issued Permit:

a) Special Conditions:

- Comparison Sampling is to be repeated.
- I&I Program language added.
- Pump Station Reliability was added.

b) Monitoring and Effluent Limitations:

- Copper and Zinc effluent limitations were re-evaluated. Based on the results of that evaluation, the copper and zinc limitations have been removed with this reissuance.
- Revised ammonia limits have been added because the ammonia limits were re-evaluated due to the upgrade and lack of sufficient data from the operation of the new plant using the updated MSTRANTI spreadsheet and water quality criteria.
- The minimum limitation for Dissolved Oxygen was increased from 3.0 mg/L to 5.0 mg/L to reflect the current VPDES Permit Manual.

23. Variances/Alternate Limits or Conditions: Not Applicable

24. Public Notice Information:

First Public Notice Date: August 12, 2010 Second Public Notice Date: August 19, 2010

Public Notice Information is required by 9VAC25-31-280 B. All pertinent information is on file and may be inspected, and copied by contacting the: DEQ Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193, Telephone No. (703) 583-3873, Douglas.Frasier@deq.virginia.gov. See **Attachment 7** for a copy of the public notice document.

Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, during the comment period. Comments shall include the name, address, and telephone number of the writer, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing if public response is significant. Requests for public hearings shall state the reason why a hearing is requested, the nature of the issues proposed to be raised in the public hearing and a brief explanation of how the requester's interests would be directly and adversely affected by the proposed permit action. Following the comment period, the Board will make a determination regarding the proposed permit action.

This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given. The public may request an electronic copy of the draft permit and fact sheet or review the draft permit and application at the DEQ Northern Regional Office by appointment.

25. 303 (d) Listed Stream Segments and Total Max. Daily Loads (TMDL):

The facility does not discharge to a stream segment that is listed in the current 303(d) list. The unnamed tributary does however flow into the South River which has two downstream impairments. (Details can be found in the planning statement located in the permit file.)

27. Additional Comments:

Previous Board Action(s): Aqua Virginia, Inc. (Aqua) was issued a Consent Order (Order) for the facility in 2004 to resolve permit effluent exceedances and was required to replace the STP with a new, expanded facility. Aqua determined that new nutrient regulations made construction of a new plant financially infeasible and proposed to transfer the flow to Caroline County Wastewater Treatment Plant. An amended Order was issued in September 2006; however, Aqua and Caroline County could not agree on terms of the transfer and Aqua submitted a formal request to again amend the Order, which became effective September 26, 2007, to upgrade and expand the existing STP to 0.22 MGD. The facility was issued a Certificate to Operate (CTO) in June 2009 for the upgrade and expansion. The Order remains active as the facility continues to work on Appendix A Schedule of Compliance Items which includes Inflow and Infiltration (I&I) work. Following closure of the Order, the facility will continue I&I work as noted and as part of this permit reissuance.

Staff Comments: None.

Public Comment: No comments were received during the public notice.

EPA Checklist: The checklist can be found in **Attachment 8**.

Lake Land 'Or
Fact Sheet Attachments – Table of Contents
VA0060887

Updated South River Flow Frequency Determination
Land Or WWTP – VA0060887

Mattaponi River near Bowling Green, VA (#01674000):

Drainage Area = 257 mi^2

Low flow		High flow	
1Q10 = 0.26 cfs	0.168 mgd	1Q10 = 14 cfs	9.05 mgd
7Q10 = 0.36 cfs	0.233 mgd	7Q10 = 19 cfs	12.3 mgd
30Q5 = 2.5 cfs	1.6 mgd	30Q10 = 38 cfs	24.6 mgd
30Q10 = 0.93 cfs	0.601 mgd	HM = 0.0 cfs	0.0 mgd

South River above Motto River:

Drainage Area = 23.75 mi^2

Low flow		High flow	
1Q10 = 0.024 cfs	0.16 mgd	1Q10 = 1.29 cfs	.834 mgd
7Q10 = 0.033 cfs	0.021 mgd	7Q10 = 1.76 cfs	1.14 mgd
30Q5 = 0.23 cfs	0.149 mgd	30Q10 = 3.51 cfs	2.27 mgd
30Q10 = 0.086 cfs	0.056 mgd	HM = 0.0 cfs	= 0.0 mgd

(Gaging station data December – May 1943 – 2003)

Attachment 1

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
Water Quality Assessments and Planning
629 E. Main Street P.O. Box 10009 Richmond, Virginia 23240

SUBJECT: Flow Frequency Determination - Revised
Land 'Or Utility - #VA0060887

TO: April Young, NRO

FROM: Paul Herman, WQAP

DATE: July 30, 1996

COPIES: Ron Gregory, Charles Martin, Dale Phillips, File

This memo supercedes my memo to you dated July 12, 1996. It addresses conditions discovered during the permit writers recent inspection of the subject facility and provides flow frequencies and drainage areas for specific points downstream of the discharge point for modeling purposes.

The inspection showed the outfall location has been incorrect in the permit application and in past permits. The discharge is actually directly to the unnamed tributary approximately 500' upstream from its confluence with the South River. The flow frequencies for the new discharge point are the same as in the original memo. The values at the discharge point were determined by inspection of the USGS Ladysmith Quadrangle topographical map which shows the receiving stream as a swamp at the discharge point. The flow frequencies for swamps are 0.0 cfs for the 1Q10, 7Q10, 30Q5, high flow 1Q10, high flow 7Q10, and the harmonic mean. Please check with Dale Phillips concerning the special considerations given to discharges to swamps.

The discharge travels roughly 500' down the swamp and enters the South River. The drainage area of the swamp at the discharge point is 13.1 mi^2. The drainage area of the South River above the swamp is 2.58 mi^2. The drainage area of the South River above its confluence with the Motto River is 23.75 mi^2 and the drainage area of the Motto River at its mouth is 15.47 mi^2.

The flow frequencies for the South River above the Motto River were determined using the continuous record gage on the Mattaponi River near Bowling Green, VA (#01674000). This gage has been operated by the VDEQ and USGS since 1942 and is located at the Route 605 bridge in Caroline County. The flow frquencies were determined using drainage area proportions and do not address any withdrawals, discharges, or springs which may lie upstream.

Mattaponi River near Bowling Green, VA (#01674000):

Drainage Area = 257 mi^2

1Q10 = 0.50 cfs	High Flow 1Q10 = 25 cfs
7Q10 = 0.57 cfs	High Flow 7Q10 = 31 cfs
30Q5 = 3.4 cfs	HM = 0.0 cfs

South River above Motto River:

Drainage Area = 23.75 mi^2

1Q10 = 0.046 cfs	High Flow 1Q10 = 2.3 cfs
7Q10 = 0.053 cfs	High Flow 7Q10 = 2.9 cfs
30Q5 = 0.31 cfs	HM = 0.0 cfs

The high flow months are December through May. If you have any questions concerning this analysis, please let me know.

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
NORTHERN VIRGINIA REGIONAL OFFICE

1549 OLD BRIDGE ROAD, SUITE 108 WOODBRIDGE, VIRGINIA 22192

SUBJECT: **Land' Or Utility, Inc., VA0060887, Permit Reissuance Flow Increase Modeling**

TO: **Dale Philips, WPS**

FROM: **April J. Young**

DATE: **August 8, 1996**

The Land Or' Utility permit is up for reissuance and the owners have requested an additional flow of .2 MGD be included in with the .1 MGD permit. This memo is to request your assistance in determining the most appropriate way to approach establishing limitations for this discharge.

The original model, circa 1973 (attached), assumed a slight critical stream flow and a flow velocity of .25 fps, over a 5.5 mile segment. Present day critical flow is assumed to be zero, and I believe the flow velocity including the discharge will probably be less than 0.25 fps.

The topo map indicates that the unnamed trib area above the discharge is heavy swamp or marsh area. The discharge from the wastewater plant enters the unnamed tributary approximately 500 feet ahead of the confluence of South River. The UT at the discharge is fairly wide, but defined with a few lily pads and grasses present. It appears that the only reason that the UT is wide at the discharge is due to the enormous culvert pipe, which is under the road, for catastrophic failure of the dam at the main lake. The UT below the discharge, and at the confluence of South River, reduces to about 3- 6 feet, but again is a defined channel. We did not see many other water plants in the stream below the confluence of the two streams. Even with a stream flow from the dam overflow on the day of the inspection, the stream was very muddy, silty and slow moving. South River below Route 1 appears to be well defined and approximately 3-4 feet wide.

Just for the sake of turning over all the stones, I attempted to run the regional model, with my best estimates for the critical flow stream conditions, without much success. Even though the UT and South River are generally contained within a defined channel, it is my best opinion that this channel is very stagnant or of very low velocity during the dry months of the year. Since the facility will require end of pipe ammonia limitations in the 1.5 mg/l range, and the questionable applicability of the regional model to this situation, I am leaning toward the application of effluent limits for swamp and marsh waters (CBOD - 10 mg/l, TKN - 3 mg/l, and D.O. - 3 mg/l).

One point about the "Advisory Notification of Effluent Limits for Swamp and Marsh Water", which has been questioned, is if the TKN limit of 3 mg/l is intended to be a year round limit, or a summer/seasonal limit. I am assuming that it was intended to be a year round limit, but would like your opinion on this question.

I have included the following attachments to aid in your review:

July 12, 1973 Stream Sanitation Analysis and Model
July 30, 1996 Flow Frequency Analysis
June 25, 1996 Facility and Stream Inspection
Stream Inspection Report Form

To: April J. Young@WDBR1@DEQ
Cc:
Bcc:
From: Maynard D. Phillips@WPS@DEQ
Subject:
Date: Tuesday, August 13, 1996 13:21:37 EDT
Attach:
Certify: N
Forwarded by:

I am generally familiar with the streams in and around the Ladysmith area. I agree that application of the state model will be of very limited usefulness for most streams in that area. I do not think that limits of 10,10,3 are out of line, particularly, for a discharge to what is essentially a dry stream (the lake overflow cannot be counted on during extreme drought conditions) having some swamp like characteristicsand would support your judgement to apply such limits wheather or not the stream is a officially a "swamp".

The TKN limits in the swamp waters guidance were designed to reduce the total ultimate BOD discharged to a swamp and thereby limit the impact on D.O. This TKN limit may be tiered based on temperature. I thought that there was a memo from me running around out there on this subject but maybe not. Basically, nBOD is not exerted to any significant extent at temperatures below about 10 degrees centigrade. Therefore if a permit has a TKN limit based on maintenance of D.O. that limit can be completely removed for the period when the monthly average temperature is less than 10 C.

However, now that we have an ammonia standard you will have to put a limit in for ammonia when the TKN limit is not applicable, e.g. you will have a permit with a summer TKN limit to control D.O. and a winter ammonia limit to control toxicity. Note: the limit of 3 TKN assumes that ammonia is zero so a separate ammonia limit is not needed in the summer.

I hope this is sufficient for you to proceed with the Land'Or permit, if you need more assistance or want to discuss any of the issues give me a call, E-Mail or what ever.

By the way, did the instructions for obtaining and printing the graphics from the Rappahannock model work?

E. Swamp and Marsh Waters

In a swamp environment, mixing is very limited. Due to the generally wide expanse of shallow, standing water, the effluent tends to displace ambient water so that initial mixing processes occur in an area where no significant dilution is available. There is very little turbulence and ambient mixing is mostly due to concentration gradients. Thus, it takes place very, very slowly.

Tidal marshes are periodically flooded at high tide but usually do not have standing water during the entire tidal cycle. Mixing in this situation is intermittent and complicated and is not amenable to analysis.

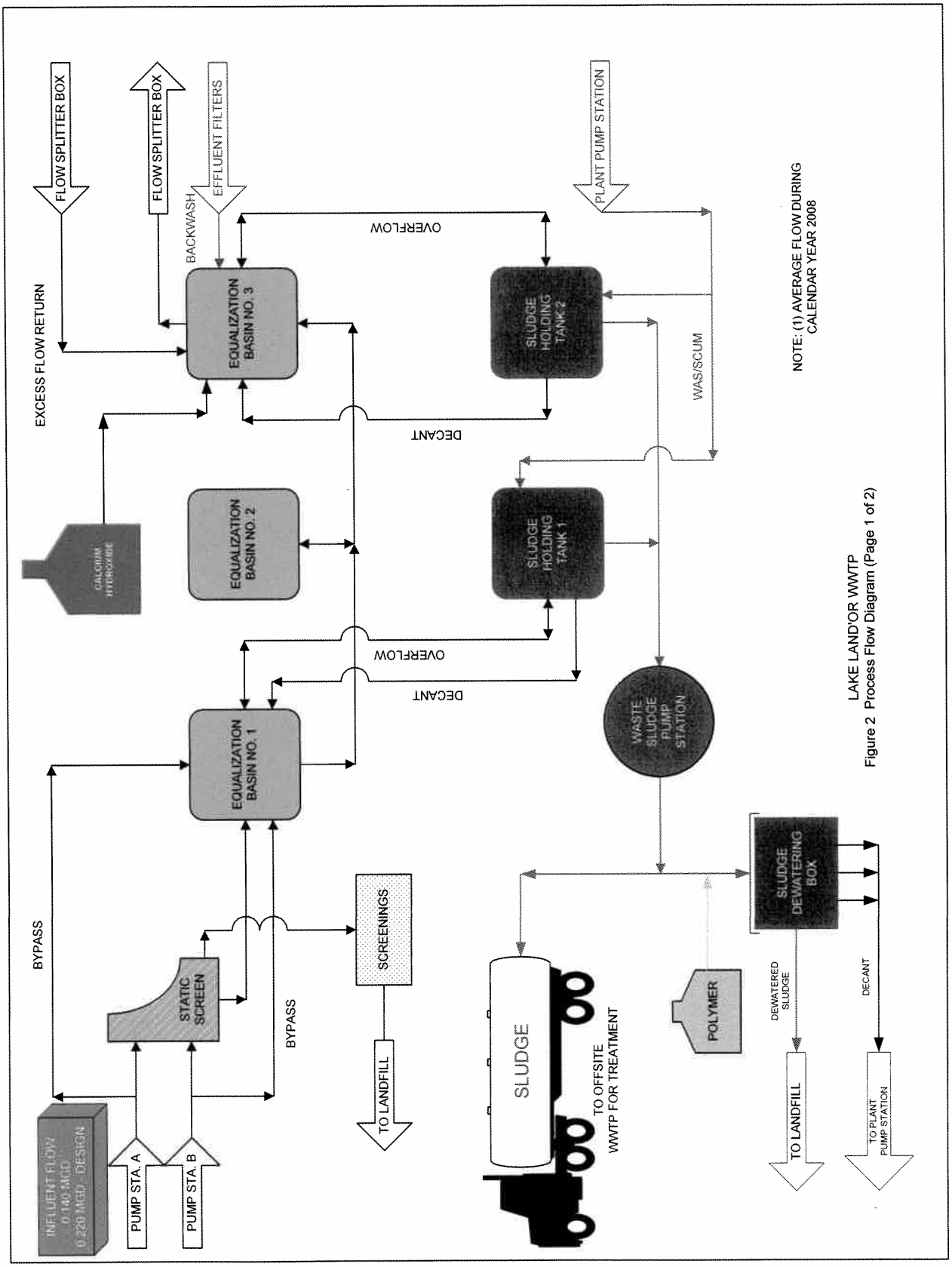
No mixing zones should be allowed in these situations unless the discharger provides actual physical/chemical data to demonstrate acceptable conditions. This means that the effluent itself should meet all applicable criteria prior to discharge. Due to the generally poor mixing and possibly high instream waste concentrations in portions of the receiving streams where this guidance will be applied, it is necessary that these "self sustaining" effluent limits be utilized. Treat TRC and other toxics as "end of pipe" limits.

In keeping with the preceding discussion, OWPP has recommended the following effluent limits for discharges from municipal treatment facilities into swamp and marsh waters where the discharge cannot be easily modeled. These limits have been found to be representative of "self-sustaining" effluents. In effect, this means that the effluent will not normally violate the stream standards even if the stream consists of 100% effluent.

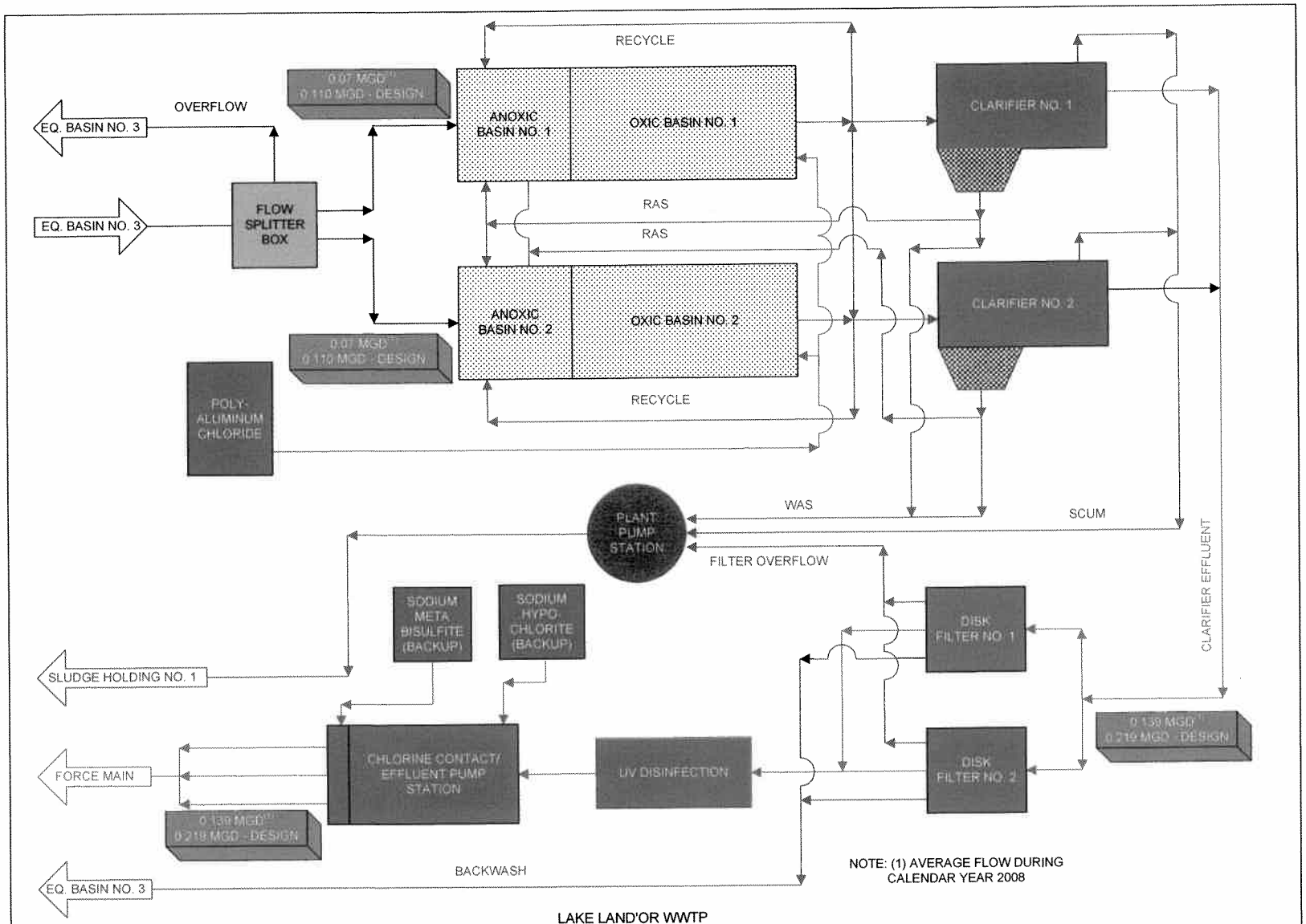
Parameter	Monthly Average	Weekly Average
$CBOD_5$:	10 mg/l	15 mg/l
TSS :	10 mg/l	15 mg/l
TKN :	3.0 mg/l	4.5 mg/l
D.O. :	5.0 mg/l (minimum)	

A TKN limit of 3.0 mg/l is stringent enough to protect any receiving waters from ammonia toxicity, hence an NH_3-N limit is unnecessary.

This guidance was condensed from a March 9, 1987 SWCB memo entitled "Advisory Notification of Effluent Limits for Swamp and Marsh Waters". Contact OWPP for additional information concerning these limits if you have questions or concerns.

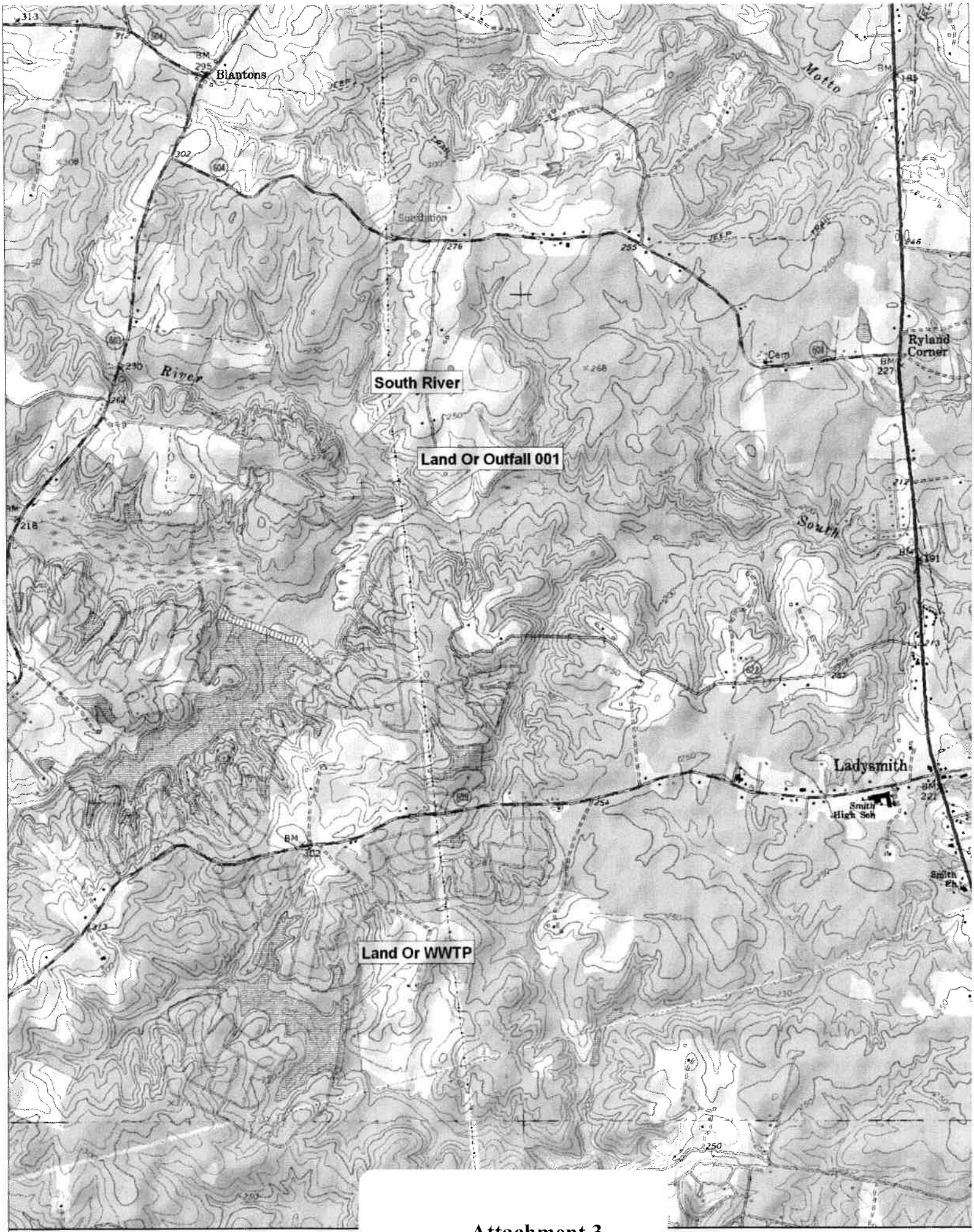


Attachment 2



LAKE LAND'OR WWTP

Figure 2 Process Flow Diagram (Page 2 of 2)



Attachment 3

March 17, 2010
MEMORANDUM

TO: Permit Reissuance File

FROM: Susan Oakes - NRO

SUBJECT: Site Visit of Land 'Or WWTP (Aqua-Virginia) VA0060887

The purpose of this memo is to detail the facility site and outfall inspection conducted at the facility cited above, on March 16, 2010 for the permit reissuance.

Land 'Or WWTP is a municipal wastewater treatment plant with a current design capacity of 0.22 MGD. The facility treats domestic discharge from a residential community (Lake Land'Or) with an estimated 964 connections.

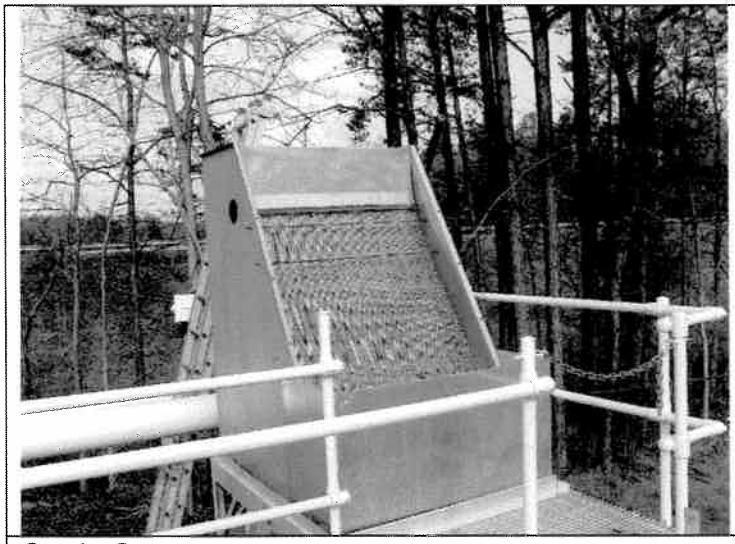
Collected wastewater enters the plant through the static screen which removes non-organic material from the influent wastewater. Any screened material is collected in a dumpster for disposal to a landfill. From the static screen, influent flow enters Equalization (EQ) Basin 1, EQ Basin 2 and or EQ Basin 3. Calcium Hydroxide is added at EQ Basin 1 to supplement alkalinity to the subsequent nitrification process. Flow then makes its way to the flow splitter box where it enters a dual train system comprised of anoxic basins and oxic basins, for denitrification and nitrification. Piping within the oxic basins can return mixed liquor to the anoxic basins to aid in the denitrification process. Flow from the oxic basins enters the clarifier basins where solids settle. Manual skimmers are used tow to three times a day to return floating solids to the pump station which then in turn pumps the solids back to the digesters/holding tanks. Any solids that settle here are recycled as return activated sludge. A licensed sludge hauler removes the digested sludge twice a week for disposal to Little Falls Run WWTF. Delpac polymer can be added to the clarifier to help settle out phosphorus. After the clarifiers, the wastewater flows to the Aqua Disk filters which are submerged 6-disk cloth media. Backwash water from the disk filters is returned to EQ Basin 1 and to the digester. The wastewater then flows to UV disinfection. The facility has a backup TRC system in case of UV failure. Wastewater is pumped from the facility to step aeration where it discharges to an unnamed tributary (UT) of the South River. The UT was free flowing and muddy most likely due to all the runoff from the snowstorms this winter.

It was also noted that pH and bacteria sampling need to be taken at the original outfall 001. Additionally, if there is an overflow at the plant, the facility needs to contact VDH as there is the potential to impact drinking water source at Lake Caroline.

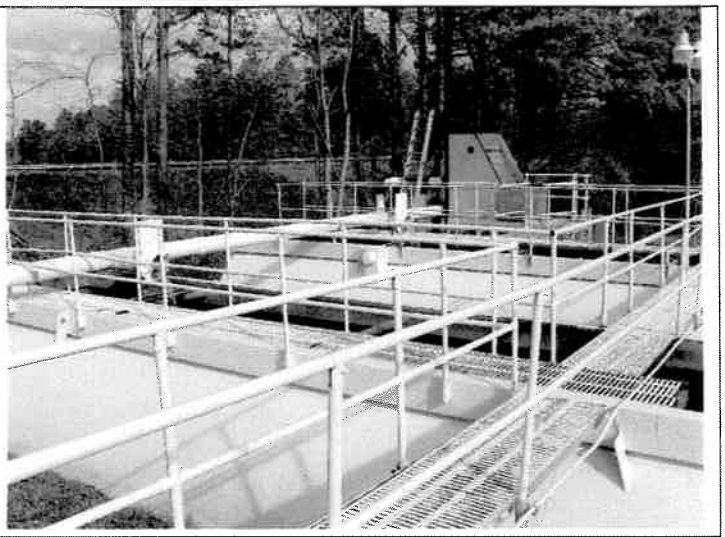
The following items have been relayed to compliance staff for follow-up:

- The DO meter is calibrated every six months,
- pH buffers are not changed daily,
- Erosion on the side of the aeration steps are in need of repair, and
- Operator is a Class III Operator.

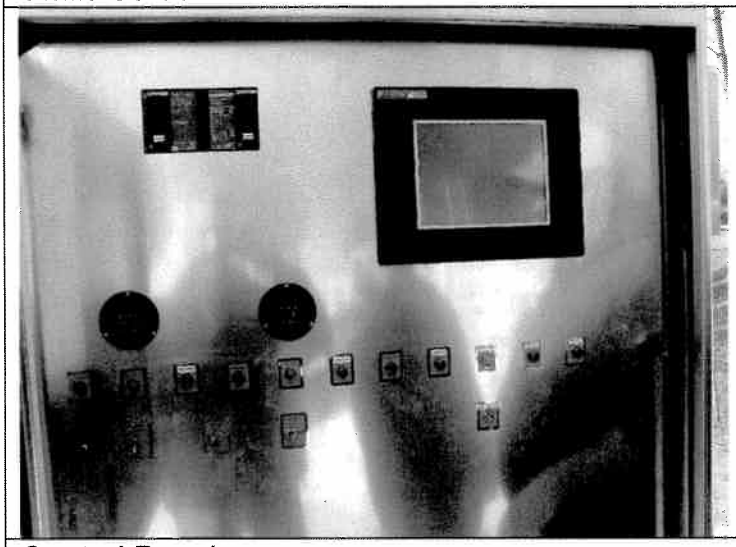
Attachment 4



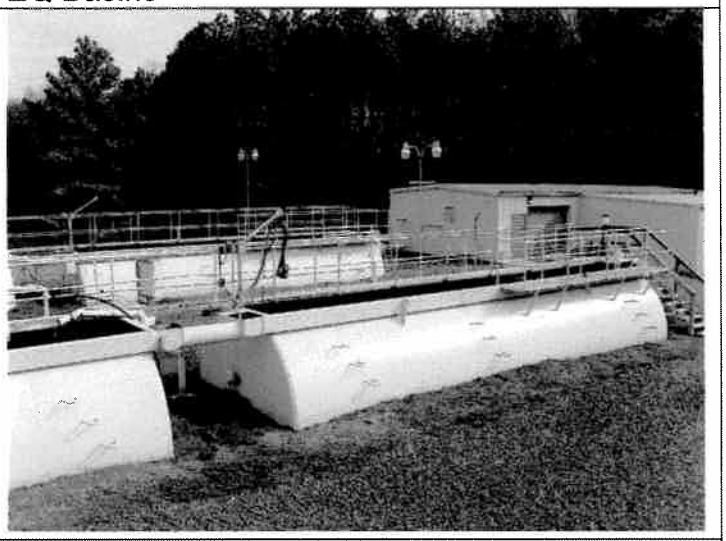
Static Screen



EQ Basins

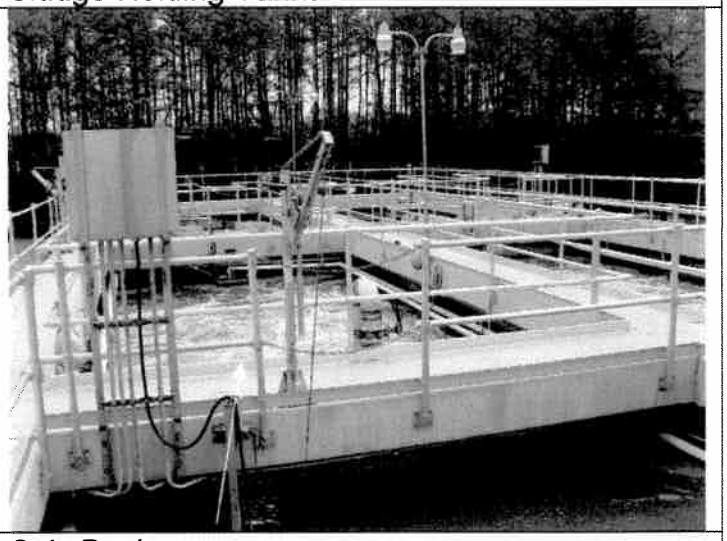


Control Panel



Sludge Holding Tanks

Anoxic Basin



Oxic Basin

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Lake Land Or WWTP Permit No.: VA0060887

Receiving Stream: South River, UT Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		Stream Flows		Mixing Information		Effluent Information	
Mean Hardness (as CaCO3) =	mg/L	1Q10 (Annual) =	0 MGD	Annual - 1Q10 Mix =	0 %	Mean Hardness (as CaCO3) =	129 mg/L
90% Temperature (Annual) =	deg C	7Q10 (Annual) =	0 MGD	- 7Q10 Mix =	0 %	90% Temp (Annual) =	25 deg C
90% Temperature (Wet season) =	deg C	30Q10 (Annual) =	0 MGD	- 30Q10 Mix =	0 %	90% Temp (Wet season) =	25 deg C
90% Maximum pH =	SU	1Q10 (Wet season) =	0 MGD	Wet Season - 1Q10 Mix =	0 %	90% Maximum pH =	8 SU
10% Maximum pH =	SU	30Q10 (Wet season)	0 MGD	- 30Q10 Mix =	0 %	10% Maximum pH =	SU
Tier Designation (1 or 2) =	1	30Q5 =	0 MGD			Discharge Flow =	0.22 MGD
Public Water Supply (PWS) Y/N? =	n	Harmonic Mean =	0 MGD				
Trout Present Y/N? =	n						
Early Life Stages Present Y/N? =	y						

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Acenapthene	0	--	--	na	9.9E+02	--	--	na	9.9E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**9.9E+02**
Acrolein	0	--	--	na	9.3E+00	--	--	na	9.3E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**9.3E+00**
Acrylonitrile[C]	0	--	--	na	2.5E+00	--	--	na	2.5E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.5E+00**
Aldrin [C]	0	3.0E+00	--	na	5.0E-04	3.0E+00	--	na	5.0E-04	--	--	--	--	--	--	--	--	**3.0E+00**	**--**	**na**	**5.0E-04**
Ammonia-N (mg/l) (Yearly)	0	8.41E+00	1.24E+00	na	--	8.4E+00	1.2E+00	na	--	--	--	--	--	--	--	--	--	**8.4E+00**	**1.2E+00**	**na**	**--**
Ammonia-N (mg/l) (High Flow)	0	8.41E+00	1.24E+00	na	--	8.4E+00	1.2E+00	na	--	--	--	--	--	--	--	--	--	**8.4E+00**	**1.2E+00**	**na**	**--**
Anthracene	0	--	--	na	4.0E+04	--	--	na	4.0E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.0E+04**
Antimony	0	--	--	na	6.4E+02	--	--	na	6.4E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.4E+02**
Arsenic	0	3.4E+02	1.5E+02	na	--	3.4E+02	1.5E+02	na	--	--	--	--	--	--	--	--	--	**3.4E+02**	**1.5E+02**	**na**	**--**
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Benzene [C]	0	--	--	na	5.1E+02	--	--	na	5.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.1E+02**
Benzidine[C]	0	--	--	na	2.0E-03	--	--	na	2.0E-03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.0E-03**
Benzo (a) anthracene [C]	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.8E-01**
Benzo (b) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.8E-01**
Benzo (k) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.8E-01**
Benzo (a) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.8E-01**
Bis2-Chloroethyl Ether[C]	0	--	--	na	5.3E+00	--	--	na	5.3E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.3E+00**
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	6.5E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.5E+04**
Bis 2-Ethylhexyl Phthalate [C]	0	--	--	na	2.2E+01	--	--	na	2.2E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.2E+01**
Bromoform [C]	0	--	--	na	1.4E+03	--	--	na	1.4E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.4E+03**
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	1.9E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.9E+03**
Cadmium	0	5.2E+00	1.4E+00	na	--	5.2E+00	1.4E+00	na	--	--	--	--	--	--	--	--	--	**5.2E+00**	**1.4E+00**	**na**	**--**
Carbon Tetrachloride [C]	0	--	--	na	1.6E+01	--	--	na	1.6E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.6E+01**
Chlordane [C]	0	2.4E+00	4.3E-03	na	8.1E-03	2.4E+00	4.3E-03	na	8.1E-03	--	--	--	--	--	--	--	--	**2.4E+00**	**4.3E-03**	**na**	**8.1E-03**
Chloride	0	8.6E+05	2.3E+05	na	--	8.6E+05	2.3E+05	na	--	--	--	--	--	--	--	--	--	**8.6E+05**	**2.3E+05**	**na**	**--**
TRC	0	1.9E+01	1.1E+01	na	--	1.9E+01	1.1E+01	na	--	--	--	--	--	--	--	--	--	**1.9E+01**	**1.1E+01**	**na**	**--**
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	1.6E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.6E+03**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane[C]	0	--	--	na	1.3E+02	--	--	na	1.3E+02	--	--	--	--	--	--	--	--	--	--	na	1.3E+02
Chloroform	0	--	--	na	1.1E+04	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	1.6E+03	--	--	--	--	--	--	--	--	--	--	na	1.6E+03
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	1.5E+02	--	--	--	--	--	--	--	--	--	--	na	1.5E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	8.3E-02	4.1E-02	na	--	--	--	--	--	--	--	--	--	8.3E-02	4.1E-02	na	--
Chromium III	0	7.0E+02	9.1E+01	na	--	7.0E+02	9.1E+01	na	--	--	--	--	--	--	--	--	--	7.0E+02	9.1E+01	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.6E+01	1.1E+01	na	--	--	--	--	--	--	--	--	--	1.6E+01	1.1E+01	na	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Chrysene[C]	0	--	--	na	1.8E-02	--	--	na	1.8E-02	--	--	--	--	--	--	--	--	--	--	na	1.8E-02
Copper	0	1.7E+01	1.1E+01	na	--	1.7E+01	1.1E+01	na	--	--	--	--	--	--	--	--	--	1.7E+01	1.1E+01	na	--
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	2.2E+01	5.2E+00	na	1.6E+04	--	--	--	--	--	--	--	--	2.2E+01	5.2E+00	na	1.6E+04
DDD[C]	0	--	--	na	3.1E-03	--	--	na	3.1E-03	--	--	--	--	--	--	--	--	--	--	na	3.1E-03
DDE[C]	0	--	--	na	2.2E-03	--	--	na	2.2E-03	--	--	--	--	--	--	--	--	--	--	na	2.2E-03
DDT[C]	0	1.1E+00	1.0E-03	na	2.2E-03	1.1E+00	1.0E-03	na	2.2E-03	--	--	--	--	--	--	--	--	1.1E+00	1.0E-03	na	2.2E-03
Demeton	0	--	1.0E-01	na	--	--	1.0E-01	na	--	--	--	--	--	--	--	--	--	--	1.0E-01	na	--
Diazinon	0	1.7E-01	1.7E-01	na	--	1.7E-01	1.7E-01	na	--	--	--	--	--	--	--	--	--	1.7E-01	1.7E-01	na	--
Dibenz(a,h)anthracene[C]	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	1.3E+03	--	--	--	--	--	--	--	--	--	--	na	1.3E+03
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	9.6E+02	--	--	--	--	--	--	--	--	--	--	na	9.6E+02
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	1.9E+02	--	--	--	--	--	--	--	--	--	--	na	1.9E+02
3,3-Dichlorobenzidine[C]	0	--	--	na	2.8E-01	--	--	na	2.8E-01	--	--	--	--	--	--	--	--	--	--	na	2.8E-01
Dichlorobromomethane[C]	0	--	--	na	1.7E+02	--	--	na	1.7E+02	--	--	--	--	--	--	--	--	--	--	na	1.7E+02
1,2-Dichloroethane[C]	0	--	--	na	3.7E+02	--	--	na	3.7E+02	--	--	--	--	--	--	--	--	--	--	na	3.7E+02
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	7.1E+03	--	--	--	--	--	--	--	--	--	--	na	7.1E+03
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	1.0E+04	--	--	--	--	--	--	--	--	--	--	na	1.0E+04
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	2.9E+02	--	--	--	--	--	--	--	--	--	--	na	2.9E+02
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,2-Dichloropropane[C]	0	--	--	na	1.5E+02	--	--	na	1.5E+02	--	--	--	--	--	--	--	--	--	--	na	1.5E+02
1,3-Dichloropropene[C]	0	--	--	na	2.1E+02	--	--	na	2.1E+02	--	--	--	--	--	--	--	--	--	--	na	2.1E+02
Dieldrin[C]	0	2.4E-01	5.6E-02	na	5.4E-04	2.4E-01	5.6E-02	na	5.4E-04	--	--	--	--	--	--	--	--	2.4E-01	5.6E-02	na	5.4E-04
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	4.4E+04	--	--	--	--	--	--	--	--	--	--	na	4.4E+04
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	8.5E+02	--	--	--	--	--	--	--	--	--	--	na	8.5E+02
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	1.1E+06	--	--	--	--	--	--	--	--	--	--	na	1.1E+06
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	4.5E+03	--	--	--	--	--	--	--	--	--	--	na	4.5E+03
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	5.3E+03	--	--	--	--	--	--	--	--	--	--	na	5.3E+03
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	2.8E+02	--	--	--	--	--	--	--	--	--	--	na	2.8E+02
2,4-Dinitrotoluene[C]	0	--	--	na	3.4E+01	--	--	na	3.4E+01	--	--	--	--	--	--	--	--	--	--	na	3.4E+01
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	5.1E-08	--	--	--	--	--	--	--	--	--	--	na	5.1E-08
1,2-Diphenylhydrazine[C]	0	--	--	na	2.0E+00	--	--	na	2.0E+00	--	--	--	--	--	--	--	--	--	--	na	2.0E+00
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.2E-01	5.6E-02	na	8.9E+01	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	na	8.9E+01
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.2E-01	5.6E-02	na	8.9E+01	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	na	8.9E+01
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	2.2E-01	5.6E-02	--	--	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	--	--
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	8.9E+01	--	--	--	--	--	--	--	--	--	--	na	8.9E+01
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	8.6E-02	3.6E-02	na	6.0E-02	--	--	--	--	--	--	--	--	8.6E-02	3.6E-02	na	6.0E-02
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	3.0E-01	--	--	--	--	--	--	--	--	--	--	na	3.0E-01

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	2.1E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.1E+03**
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	1.4E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.4E+02**
Fluorene	0	--	--	na	5.3E+03	--	--	na	5.3E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.3E+03**
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Guthion	0	--	1.0E-02	na	--	--	1.0E-02	na	--	--	--	--	--	--	--	--	--	**--**	**1.0E-02**	**na**	**--**
Heptachlor [C]	0	5.2E-01	3.8E-03	na	7.9E-04	5.2E-01	3.8E-03	na	7.9E-04	--	--	--	--	--	--	--	--	**5.2E-01**	**3.8E-03**	**na**	**7.9E-04**
Heptachlor Epoxide [C]	0	5.2E-01	3.8E-03	na	3.9E-04	5.2E-01	3.8E-03	na	3.9E-04	--	--	--	--	--	--	--	--	**5.2E-01**	**3.8E-03**	**na**	**3.9E-04**
Hexachlorobenzene [C]	0	--	--	na	2.9E-03	--	--	na	2.9E-03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.9E-03**
Hexachlorobutadiene [C]	0	--	--	na	1.8E+02	--	--	na	1.8E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.8E+02**
Hexachlorocyclohexane Alpha-BHC [C]	0	--	--	na	4.9E-02	--	--	na	4.9E-02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.9E-02**
Hexachlorocyclohexane Beta-BHC [C]	0	--	--	na	1.7E-01	--	--	na	1.7E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.7E-01**
Hexachlorocyclohexane Gamma-BHC [C] (Lindane)	0	9.5E-01	na	na	1.8E+00	9.5E-01	--	na	1.8E+00	--	--	--	--	--	--	--	--	**9.5E-01**	**--**	**na**	**1.8E+00**
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	1.1E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.1E+03**
Hexachloroethane [C]	0	--	--	na	3.3E+01	--	--	na	3.3E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.3E+01**
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	2.0E+00	na	--	--	--	--	--	--	--	--	--	**--**	**2.0E+00**	**na**	**--**
Indeno (1,2,3-cd) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.8E-01**
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Isophorone [C]	0	--	--	na	9.6E+03	--	--	na	9.6E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**9.6E+03**
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	**--**	**0.0E+00**	**na**	**--**
Lead	0	1.6E+02	1.9E+01	na	--	1.6E+02	1.9E+01	na	--	--	--	--	--	--	--	--	--	**1.6E+02**	**1.9E+01**	**na**	**--**
Malathion	0	--	1.0E-01	na	--	--	1.0E-01	na	--	--	--	--	--	--	--	--	--	**--**	**1.0E-01**	**na**	**--**
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Mercury	0	1.4E+00	7.7E-01	--	--	1.4E+00	7.7E-01	--	--	--	--	--	--	--	--	--	--	**1.4E+00**	**7.7E-01**	**--**	**--**
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	1.5E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.5E+03**
Methylene Chloride [C]	0	--	--	na	5.9E+03	--	--	na	5.9E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.9E+03**
Methoxychlor	0	--	3.0E-02	na	--	--	3.0E-02	na	--	--	--	--	--	--	--	--	--	**--**	**3.0E-02**	**na**	**--**
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	**--**	**0.0E+00**	**na**	**--**
Nickel	0	2.3E+02	2.5E+01	na	4.6E+03	2.3E+02	2.5E+01	na	4.6E+03	--	--	--	--	--	--	--	--	**2.3E+02**	**2.5E+01**	**na**	**4.6E+03**
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	6.9E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.9E+02**
N-Nitrosodimethylamine [C]	0	--	--	na	3.0E+01	--	--	na	3.0E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.0E+01**
N-Nitrosodiphenylamine [C]	0	--	--	na	6.0E+01	--	--	na	6.0E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.0E+01**
N-Nitrosodi-n-propylamine [C]	0	--	--	na	5.1E+00	--	--	na	5.1E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.1E+00**
Nonylphenol	0	2.8E+01	6.6E+00	--	--	2.8E+01	6.6E+00	na	--	--	--	--	--	--	--	--	--	**2.8E+01**	**6.6E+00**	**na**	**--**
Parathion	0	6.5E-02	1.3E-02	na	--	6.5E-02	1.3E-02	na	--	--	--	--	--	--	--	--	--	**6.5E-02**	**1.3E-02**	**na**	**--**
PCB Total [C]	0	--	1.4E-02	na	6.4E-04	--	1.4E-02	na	6.4E-04	--	--	--	--	--	--	--	--	**--**	**1.4E-02**	**na**	**6.4E-04**
Pentachlorophenol [C]	0	7.7E-03	5.9E-03	na	3.0E+01	7.7E-03	5.9E-03	na	3.0E+01	--	--	--	--	--	--	--	--	**7.7E-03**	**5.9E-03**	**na**	**3.0E+01**
Phenol	0	--	--	na	8.6E+05	--	--	na	8.6E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.6E+05**
Pyrene	0	--	--	na	4.0E+03	--	--	na	4.0E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.0E+03**
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Beta and Photon Activity (mrem/yr)	0	--	--	na	4.0E+00	--	--	na	4.0E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.0E+00**
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	2.0E+01	5.0E+00	na	4.2E+03	--	--	--	--	--	--	--	--	**2.0E+01**	**5.0E+00**	**na**	**4.2E+03**
Silver	0	5.3E+00	--	na	--	5.3E+00	--	na	--	--	--	--	--	--	--	--	--	**5.3E+00**	**--**	**na**	**--**
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
1,1,2,2-Tetrachloroethane[C]	0	--	--	na	4.0E+01	--	--	na	4.0E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.0E+01**
Tetrachloroethylene[C]	0	--	--	na	3.3E+01	--	--	na	3.3E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.3E+01**
Thallium	0	--	--	na	4.7E-01	--	--	na	4.7E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.7E-01**
Toluene	0	--	--	na	6.0E+03	--	--	na	6.0E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.0E+03**
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Toxaphene [C]	0	7.3E-01	2.0E-04	na	2.8E-03	7.3E-01	2.0E-04	na	2.8E-03	--	--	--	--	--	--	--	--	**7.3E-01**	**2.0E-04**	**na**	**2.8E-03**
Tributyltin	0	4.6E-01	7.2E-02	na	--	4.6E-01	7.2E-02	na	--	--	--	--	--	--	--	--	--	**4.6E-01**	**7.2E-02**	**na**	**--**
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	7.0E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**7.0E+01**
1,1,2-Trichloroethane[C]	0	--	--	na	1.6E+02	--	--	na	1.6E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.6E+02**
Trichloroethylene [C]	0	--	--	na	3.0E+02	--	--	na	3.0E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.0E+02**
2,4,6-Trichlorophenol [C]	0	--	--	na	2.4E+01	--	--	na	2.4E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.4E+01**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Vinyl Chloride[C]	0	--	--	na	2.4E+01	--	--	na	2.4E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.4E+01**
Zinc	0	1.5E+02	1.5E+02	na	2.6E+04	1.5E+02	1.5E+02	na	2.6E+04	--	--	--	--	--	--	--	--	**1.5E+02**	**1.5E+02**	**na**	**2.6E+04**

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
   Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	6.4E+02
Arsenic	9.0E+01
Barium	na
Cadmium	8.3E-01
Chromium III	5.5E+01
Chromium VI	6.4E+00
Copper	6.7E+00
Iron	na
Lead	1.1E+01
Manganese	na
Mercury	4.6E-01
Nickel	1.5E+01
Selenium	3.0E+00
Silver	2.1E+00
Zinc	5.8E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

9/10/2010 2:57:38 PM

Facility = Land Or
Chemical = Ammonia
Chronic averaging period = 30
WLAa = 8.4
WLAc = 1.2
Q.L. = 0.2
# samples/mo. = 12
# samples/wk. = 3

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 2.42120411209957
Average Weekly limit = 1.77097449401967
Average Monthly LImit = 1.31914452348425

The data are:

9

1/13/2010 11:36:18 AM

Facility = Lake Land Or WWTP
Chemical = TRC
Chronic averaging period = 4
WLAa = 0.019
WLAc = 0.011
Q.L. = .1
# samples/mo. = 30
# samples/wk. = 8

Summary of Statistics:

observations = 1
Expected Value = .2
Variance = .0144
C.V. = 0.6
97th percentile daily values = .486683
97th percentile 4 day average = .332758
97th percentile 30 day average= .241210
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 1.60883226245855E-02
Average Weekly limit = 9.59676626920106E-03
Average Monthly LImit = 7.9737131838758E-03

The data are:

0.2

12/8/2009 11:56:53 AM

Facility = Lake Land Or WWTP
Chemical = Copper
Chronic averaging period = 4
WLAa = 17
WLAc = 11
Q.L. = 1
# samples/mo. = 4
# samples/wk. = 1

Summary of Statistics:

observations = 12
Expected Value = 3.40618
Variance = 1.70654
C.V. = 0.383523
97th percentile daily values = 6.38391
97th percentile 4 day average = 4.78261
97th percentile 30 day average= 3.85481
< Q.L. = 0
Model used = lognormal

No Limit is required for this material

The data are:

2.7
1.5
2.5
5.2
4.6
3.6
3.3
4
3.4
4
1.8
3.8

12/8/2009 11:59:42 AM

Facility = Lake Land Or WWTP
Chemical = Zinc
Chronic averaging period = 4
WLAa = 150
WLAc = 150
Q.L. = 1
# samples/mo. = 4
# samples/wk. = 1

Summary of Statistics:

observations = 12
Expected Value = 46.0509
Variance = 235.683
C.V. = 0.333369
97th percentile daily values = 80.4535
97th percentile 4 day average = 62.0186
97th percentile 30 day average= 51.3231
< Q.L. = 0
Model used = lognormal

No Limit is required for this material

The data are:

33
22
30
60
57
58
51
59
41
37
43
57

Public Notice – Environmental Permit

PURPOSE OF NOTICE: To seek public comment on a draft permit from the Department of Environmental Quality that will allow the release of treated wastewater into a water body in Caroline County, Virginia.

PUBLIC COMMENT PERIOD: August 6, 2010 to 5:00 p.m. on September 6, 2010

PERMIT NAME: Virginia Pollutant Discharge Elimination System Permit – Wastewater issued by DEQ, under the authority of the State Water Control Board

APPLICANT NAME, ADDRESS AND PERMIT NUMBER: Aqua Virginia
2414 Granite Ridge Road
Rockville, VA 24146
VA0060887

NAME AND ADDRESS OF FACILITY: LAKE LAND'OR
200 KENT DRIVE
RUTHER GLEN, VA 22546

PROJECT DESCRIPTION: Aqua Virginia, Inc. has applied for a reissuance of a permit for the private Lake Land'Or WWTP. The applicant proposes to release treated sewage wastewaters from residential areas at a rate of 0.22 million gallons per day into a water body. The sludge will be transferred to the Little Falls WWTP (VA0076392) by a licensed hauler for disposal. The facility proposes to release the treated sewage in the South River, UT in Caroline County in the York River watershed. A watershed is the land area drained by a river and its incoming streams. The permit will limit the following pollutants to amounts that protect water quality: pH, cBOD, BOD, Total Suspended Solids, Total Kjeldahl Nitrogen, Ammonia, DO, *E. coli*, Chlorine, Nitrate +Nitrite, Total Nitrogen and Total Phosphorus.

This facility is subject to the requirements of 9 VAC 25-820 and has registered for coverage under the General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Watershed in Virginia.

HOW TO COMMENT AND/OR REQUEST A PUBLIC HEARING: DEQ accepts comments and requests for public hearing by e-mail, fax or postal mail. All comments and requests must be in writing and be received by DEQ during the comment period. Submittals must include the names, mailing addresses and telephone numbers of the commenter/requester and of all persons represented by the commenter/requester. A request for public hearing must also include: 1) The reason why a public hearing is requested. 2) A brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requestor, including how and to what extent such interest would be directly and adversely affected by the permit. 3) Specific references, where possible, to terms and conditions of the permit with suggested revisions. A public hearing may be held, including another comment period, if public response is significant, based on individual requests for a public hearing, and there are substantial, disputed issues relevant to the permit.

CONTACT FOR PUBLIC COMMENTS, DOCUMENT REQUESTS AND ADDITIONAL INFORMATION: The public may review the documents at the DEQ-Northern Regional Office by appointment, or may request electronic copies of the draft permit and fact sheet.

Name: Douglas Frasier
Address: DEQ-Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193
Phone: (703) 583-3873 E-mail: douglas.frasier@deq.virginia.gov Fax: (703) 583-3821

Attachment 7

Revised 2/2003

State "Transmittal Checklist" to Assist in Targeting
Municipal and Industrial Individual NPDES Draft Permits for Review

Part I. State Draft Permit Submission Checklist

In accordance with the MOA established between the Commonwealth of Virginia and the United States Environmental Protection Agency, Region III, the Commonwealth submits the following draft National Pollutant Discharge Elimination System (NPDES) permit for Agency review and concurrence.

Facility Name:	Lake Land'Or Wastewater Treatment Plant
NPDES Permit Number:	VA0060887
Permit Writer Name:	Susan Oakes
Date:	March 1, 2010

Major [ ] **Minor** [X] **Industrial** [ ] **Municipal** [X]

I.A. Draft Permit Package Submittal Includes:	**Yes**	**No**	**N/A**
1. Permit Application?	X		
2. Complete Draft Permit (for renewal or first time permit – entire permit, including boilerplate information)?	X		
3. Copy of Public Notice?	X		
4. Complete Fact Sheet?	X		
5. A Priority Pollutant Screening to determine parameters of concern?			X
6. A Reasonable Potential analysis showing calculated WQBELs?	X		
7. Dissolved Oxygen calculations?	X		
8. Whole Effluent Toxicity Test summary and analysis?			X
9. Permit Rating Sheet for new or modified industrial facilities?			X

I.B. Permit/Facility Characteristics	**Yes**	**No**	**N/A**
1. Is this a new, or currently unpermitted facility?		X	
2. Are all permissible outfalls (including combined sewer overflow points, non-process water and storm water) from the facility properly identified and authorized in the permit?	X		
3. Does the fact sheet **or** permit contain a description of the wastewater treatment process?	X		
4. Does the review of PCS/DMR data for at least the last 3 years indicate significant non-compliance with the existing permit?		X	
5. Has there been any change in streamflow characteristics since the last permit was developed?		X	
6. Does the permit allow the discharge of new or increased loadings of any pollutants?		X	
7. Does the fact sheet **or** permit provide a description of the receiving water body(s) to which the facility discharges, including information on low/critical flow conditions and designated/existing uses?	X		
8. Does the facility discharge to a 303(d) listed water?		X	
a. Has a TMDL been developed and approved by EPA for the impaired water?			X
b. Does the record indicate that the TMDL development is on the State priority list and will most likely be developed within the life of the permit?			X
c. Does the facility discharge a pollutant of concern identified in the TMDL or 303(d) listed water?			X
9. Have any limits been removed, or are any limits less stringent, than those in the current permit?	X		
10. Does the permit authorize discharges of storm water?		X	

I.B. Permit/Facility Characteristics – cont.	Yes	No	N/A
11. Has the facility substantially enlarged or altered its operation or substantially increased its flow or production?		X	
12. Are there any production-based, technology-based effluent limits in the permit?		X	
13. Do any water quality-based effluent limit calculations differ from the State's standard policies or procedures?		X	
14. Are any WQBELs based on an interpretation of narrative criteria?	X		
15. Does the permit incorporate any variances or other exceptions to the State's standards or regulations?		X	
16. Does the permit contain a compliance schedule for any limit or condition?		X	
17. Is there a potential impact to endangered/threatened species or their habitat by the facility's discharge(s)?		X	
18. Have impacts from the discharge(s) at downstream potable water supplies been evaluated?	X		
19. Is there any indication that there is significant public interest in the permit action proposed for this facility?		X	
20. Have previous permit, application, and fact sheet been examined?	X		

Part II. NPDES Draft Permit Checklist

Region III NPDES Permit Quality Checklist – for POTWs

(To be completed and included in the record only for POTWs)

II.A. Permit Cover Page/Administration	**Yes**	**No**	**N/A**
1. Does the fact sheet or permit describe the physical location of the facility, including latitude and longitude (not necessarily on permit cover page)?	X		
2. Does the permit contain specific authorization-to-discharge information (from where to where, by whom)?	X		

II.B. Effluent Limits – General Elements	**Yes**	**No**	**N/A**
1. Does the fact sheet describe the basis of final limits in the permit (e.g., that a comparison of technology and water quality-based limits was performed, and the most stringent limit selected)?	X		
2. Does the fact sheet discuss whether "antibacksliding" provisions were met for any limits that are less stringent than those in the previous NPDES permit?			X

II.C. Technology-Based Effluent Limits (POTWs)	**Yes**	**No**	**N/A**
1. Does the permit contain numeric limits for ALL of the following: BOD (or alternative, e.g., CBOD, COD, TOC), TSS, and pH?	X		
2. Does the permit require at least 85% removal for BOD (or BOD alternative) and TSS (or 65% for equivalent to secondary) consistent with 40 CFR Part 133?	X		
a. If no, does the record indicate that application of WQBELs, or some other means, results in more stringent requirements than 85% removal or that an exception consistent with 40 CFR 133.103 has been approved?			
3. Are technology-based permit limits expressed in the appropriate units of measure (e.g., concentration, mass, SU)?	X		
4. Are permit limits for BOD and TSS expressed in terms of both long term (e.g., average monthly) and short term (e.g., average weekly) limits?	X		
5. Are any concentration limitations in the permit less stringent than the secondary treatment requirements (30 mg/l BOD5 and TSS for a 30-day average and 45 mg/l BOD5 and TSS for a 7-day average)?		X	
a. If yes, does the record provide a justification (e.g., waste stabilization pond, trickling filter, etc.) for the alternate limitations?			

II.D. Water Quality-Based Effluent Limits	**Yes**	**No**	**N/A**
1. Does the permit include appropriate limitations consistent with 40 CFR 122.44(d) covering State narrative and numeric criteria for water quality?	X		
2. Does the fact sheet indicate that any WQBELs were derived from a completed and EPA approved TMDL?			X
3. Does the fact sheet provide effluent characteristics for each outfall?	X		
4. Does the fact sheet document that a "reasonable potential" evaluation was performed?	X		
a. If yes, does the fact sheet indicate that the "reasonable potential" evaluation was performed in accordance with the State's approved procedures?	X		
b. Does the fact sheet describe the basis for allowing or disallowing in-stream dilution or a mixing zone?	X		
c. Does the fact sheet present WLA calculation procedures for all pollutants that were found to have "reasonable potential"?	X		
d. Does the fact sheet indicate that the "reasonable potential" and WLA calculations accounted for contributions from upstream sources (i.e., do calculations include ambient/background concentrations)?	X		
e. Does the permit contain numeric effluent limits for all pollutants for which "reasonable potential" was determined?	X		
II.D. Water Quality-Based Effluent Limits – cont.	**Yes**	**No**	**N/A**
5. Are all final WQBELs in the permit consistent with the justification and/or documentation	X		

provided in the fact sheet?			
6. For all final WQBELs, are BOTH long-term AND short-term effluent limits established?	X		
7. Are WQBELs expressed in the permit using appropriate units of measure (e.g., mass, concentration)?	X		
8. Does the record indicate that an "antidegradation" review was performed in accordance with the State's approved antidegradation policy?	X		

II.E. Monitoring and Reporting Requirements	**Yes**	**No**	**N/A**
1. Does the permit require at least annual monitoring for all limited parameters and other monitoring as required by State and Federal regulations?	X		
a. If no, does the fact sheet indicate that the facility applied for and was granted a monitoring waiver, AND, does the permit specifically incorporate this waiver?			
2. Does the permit identify the physical location where monitoring is to be performed for each outfall?	X		
3. Does the permit require at least annual influent monitoring for BOD (or BOD alternative) and TSS to assess compliance with applicable percent removal requirements?		X	
4. Does the permit require testing for Whole Effluent Toxicity?		X	

II.F. Special Conditions	**Yes**	**No**	**N/A**
1. Does the permit include appropriate biosolids use/disposal requirements?	X		
2. Does the permit include appropriate storm water program requirements?			X

II.F. Special Conditions – cont.	**Yes**	**No**	**N/A**
3. If the permit contains compliance schedule(s), are they consistent with statutory and regulatory deadlines and requirements?			X
4. Are other special conditions (e.g., ambient sampling, mixing studies, TIE/TRE, BMPs, special studies) consistent with CWA and NPDES regulations?	X		
5. Does the permit allow/authorize discharge of sanitary sewage from points other than the POTW outfall(s) or CSO outfalls [i.e., Sanitary Sewer Overflows (SSOs) or treatment plant bypasses]?		X	
6. Does the permit authorize discharges from Combined Sewer Overflows (CSOs)?		X	
a. Does the permit require implementation of the "Nine Minimum Controls"?			X
b. Does the permit require development and implementation of a "Long Term Control Plan"?			X
c. Does the permit require monitoring and reporting for CSO events?			X
7. Does the permit include appropriate Pretreatment Program requirements?			X

II.G. Standard Conditions	**Yes**	**No**	**N/A**
1. Does the **permit** contain all 40 CFR 122.41 standard conditions or the State equivalent (or more stringent) conditions?	X		

List of Standard Conditions – 40 CFR 122.41

Duty to comply	Property rights	Reporting Requirements
Duty to reapply	Duty to provide information	Planned change
Need to halt or reduce activity	Inspections and entry	Anticipated noncompliance
not a defense	Monitoring and records	Transfers
Duty to mitigate	Signatory requirement	Monitoring reports
Proper O & M	Bypass	Compliance schedules
Permit actions	Upset	24-Hour reporting
		Other non-compliance

2. Does the permit contain the additional standard condition (or the State equivalent or more stringent conditions) for POTWs regarding notification of new introduction of pollutants and new industrial users [40 CFR 122.42(b)]?	X		

Part III. Signature Page

Based on a review of the data and other information submitted by the permit applicant, and the draft permit and other administrative

records generated by the Department/Division and/or made available to the Department/Division, the information provided on this checklist is accurate and complete, to the best of my knowledge.

Name	Susan A. Oakes
Title	Environmental Specialist II
Signature	
Date	March 1, 2010